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able to see convinces me that the plant had a very early introduction to our flora, perhaps following the glacial period, and that under less favoring circumstances it is becoming more and more restricted, and must eventually be supplanted by more vigorous competitors for existence.

The Botany of the Aztecs.—The various aspects of a scientific subject become in these days remarkably illustrated. We have seen an example of archæological botany in the light thrown upon the ancient flora of Egypt by the discussions of the evidence afforded by a few withered wreaths disinterred with the mummy of a Pharaoh. Recently, a Spanish writer has occupied the pages of the *Anales del Museo Nacional de Mexico* with an elaborate examination of the botanical lore of the ancient Aztecs and other dwellers in Mexico at the time of the conquest. A brief resumé of his conclusions may prove of interest in the pages of the *BULLETIN*, as the *Anales* are not widely distributed, and are not generally supposed to contain matter of value to botanists.

It seems conceded that the inhabitants of pre-Columbian Mexico had made very considerable progress in botanical study; they had, according to our author, formed an artificial classification, an extended glossology, and a system of iconographic representations by which they indicated plants by conventional symbols. At the time of the conquest, botanical science in Europe had itself made little progress beyond the limited developement that it had amongst the Greeks; the classification was largely medical, and trees and herbs constituted the two great divisions of the vegetable kingdom. At this time, in Mexico, the Aztecs and related tribes had established botanical gardens in which were grown plants that had been collected from the various districts of the kingdom, from newly acquired territories and from neighboring states or tribes. Thus, the handsome Bombaceæ known as *Cheirostemon*,* which was early found flourishing outside of the usual limit of its distribution, was regarded by Baron Humboldt as a plant transplanted by the ancient Matlatzincas.

The author of this treatise has used the famous work on the natural history of Mexico by Hernandez in its re-edited form, supplementing it with the testimony of other authors, and personal search amongst Indian vocabularies. The synonymy of the Mexicans, he claims, was extended, indicating our distinction between a scientific and a common name; thus, the plant called *totoyxcitl*, 'bird's-foot,' in allusion to its quinquelobate leaves, was also called *caxtlatlapan*, which classed it with a botanical group—that of the *Convolvaceæ*, it being an *Ipomæa*.

Quite frequently the various names of a plant arose from the form or other characteristic of some portion of it, or from its uses; thus, *chapulxochitl*, meaning 'locust-flower,' because of a resemblance of the flower to that insect, was also called *tenapaltil*,† also *mincapatli*, 'arrow-

* Called by the Aztecs *macpalxochitl*, 'hand-flower,' from the peculiar shape and arrangement of the stamens.—ED.

† A name for several plants resembling *Sedum*, or life-everlasting.—ED.

medicine,' because it was employed to heal wounds; and also *comalpatli*, 'spleen-medicine,' in reference to a medical use. A regional name of *pinipiniche* was also used for this same plant. Other instances are explained where a classificatory name, and one indicating the use or properties of the plant existed. Hernandez has recorded 3,000 names of plants, of which 250 are in the Tarascan language. The remainder are Mexican, and, as a great many of these were originally found in the Mexican domain proper, where the Nahuatl language prevailed, the author concludes that the Mexicans in their marauding expeditions had observed and named them, and had also studied them in the gardens which they maintained for alien plants on the central plateau. Our author says that they availed themselves of comparisons between exotics and their indigenous plants, and "then, taking a plant with a known name as a type, and using the same name with a qualifying and expressive termination, applied it to another that was analogous or similar."

In glossology the Nahuans had reached a very considerable elaboration of descriptive and classificatory terms. Thus, in general, their terminology for plant-forms included the following: *quauhuittl*, 'tree,' *xihuittl*,* 'herb,' and *quaquauhtzin*, 'shrub.' *Copalquauhuittl*, the 'copal-tree,' was a tree-like terebinth; *copalxihuittl*, 'copal-herb,' was an herbaceous labiate; *micaquauhuittl*, the 'corpse-tree,' was an arborescent Convolvulad; and *micaxihuittl*, 'herb of the dead,' a *Lobelia*.† *Tic* was used as a suffix signifying the 'form of,' like the Greek *ειδος*; as *chichiantic*, 'like chian;' and this particle was constantly used in plant-names to indicate affinity or resemblance. The nature of the medium in which the plant grew was also considered in its nomenclature; thus *atl*, 'water,' was represented by the prefix *a* before the rest of the plant's name. If the stem of the plant was serpentine and flexible, a special term was employed, while the prostrate and recumbent positions were expressly recognized. The writer cites many examples of the application of these terms, and enters into an analysis of the expressive Mexican names for plants, one of which is in part a specific description, viz.: *tepehoilacapitzxochitl*, or, translated, an ornamental plant which grows in mountainous places, tall, and knotty, and slim.‡ The author continues in an interesting enumeration of the Indian terms for other characters of the stem, as its surface, length, thickness, coloration, composition, form, and durability, all displaying a surprising minuteness of descriptive terminology.

The Mexicans used four names for leaves: *matl*, *atlapalli*, *amatlapalli* and *izhuatl*. The first of these terms arose from an interesting

* *Xihuittl* is a generic term for herb, and *quilittl* for an edible one. To the above terminology should be added the words so frequently found in Aztec plant-names: *xochitl*, 'flower,' *xocoll*, sour 'fruit,' and *tzapotl*, sweet 'fruit' (whence Sp. *sapote*, and the name of the order Sapotaceæ).—ED.

† *Lobelia acuminata*; called also *micaxochitl*, 'flower of the dead,' from its use in restoring epileptics to consciousness.—ED.

‡ This interpretation by the Spanish writer is very erroneous. The word means, literally, 'mountain flute-flower.'—ED.

generalization. It (*mailtl*) means 'branch,'* and was frequently used in this sense. It was applied to old and young limbs, and it expressed the idea in the minds of these people that the tree was a group of branches of which the leaves were the last and most tenuous form. *Atlapalli* means both a 'leaf' and a 'bird's wing,' another interesting simile; *amatlapalli*, our author seems to think implies something thin, resembling paper (*amatl*); *izhuatl*, the last term, probably signified the frond of a palm.

The paper contains a long discussion of the involved and difficult subject of the Mexican graphic representation of plants. The Indians, for this purpose, employed three methods, the figurative, the symbolic, and the syllabic, either alone or combined. The figurative was generally used when the component parts of a plant were to be indicated, as branches, leaves, flower, fruit and seed; but the entire plant was indicated by combining the two methods of symbolism and syllabism. The conventional sign for a tree was a branching base, colored red, representing the root, from which sprang the trunk, almost always cylindrical, which was subdivided into three branches, usually gray in color, while from the extremity of each branch started a green object formed of obtuse segments representing leaves. This was the universal arborescent type, which was variously modified in separate cases. Our author asserts the use by the Indians of a sign of generic value. Thus, plants known under the general class of *zacatl* † had a special symbol which consisted of two parts, a central axis, with a series of parallel yellow lines disposed symmetrically from one to the other side of the axis.

It is insisted that the Indians of Mexico possessed very considerable skill in drawing, judging from the symmetry, and the quality of execution of these hieroglyphics.

The botanic symbol, as used for a group of plants resembling each other in some particular, gave rise to classification and nomenclature, and the discussion of this forms the last portion of the author's instalment of his studies, which are yet unfinished.

Conoidal fructification formed the generic symbol of the pines, the pod that of the Leguminosæ, the tuberous root for certain Convolvulacæ, a leaf with lateral spines for various Cactacæ. These generic signs, modified by special ones, lent themselves as a flexible instrument for the indication of subordinate groups, as the lanceolate leaf joined to a tuber indicated a variety of the edible camote [sweet potato] the stone united with a spiny leaf a species of *Opuntia*.

Our author, through a number of pages, endeavors to show that the Indians had a nomenclature similar to that invented by Linnæus.‡

* *Mailtl* is the Aztec word for 'hand,' and it was the fingers spreading out from the palm that suggested the idea of branches. Hence the name *quilmaitl*, 'herb-hand,' for the branch of an herb, and *quamaitl*, 'tree-hand,' for the branch of a tree. We have met with no compound in which *mailtl* signified 'leaf.'—ED.

† A word generic for 'grass.'—ED.

‡ We are inclined to think that the Spanish writer has a very vague idea of the Linnæan system. We have studied Hernandez's Thesaurus very carefully, as we have that rich repository of Aztec botany—Sahagun's work—but we have failed to observe any other sort of classification than that found in the popular nomenclature of plants in all languages.—ED.

This nomenclature consisted in using a specially descriptive term and prefixing it to the general name of the plant, as we might say a red rose, a climbing hop-vine, a trailing honeysuckle, etc. In this manner the Indians collected a large body of identifying names for plants, and the inference seems warranted that to this extent they possessed a nomenclature which was directly related to a useful if not altogether natural system of classification, the whole based upon striking features or useful properties of the plants they described.

In the names of plants the most interesting modifications are instanced, by some of which plants inhabiting moist places were indicated, those flowering at certain times, plants growing on the margins of streams, those commencing to flower with the first waters of the wet season, and declining with its increase, were all variously characterized. The soil in which plants grew and their habitat were also denoted by prefixes. The various parts of a plant were carefully distinguished, as the root, the trunk, the branches, the leaves, the flower, the fruit. These terms were again modified by specific designations when the parts assumed peculiar shapes or possessed peculiar properties.

The features of the trunk and branches and the disposition of the latter, and the habit of the growing plant found mention in the terms and names employed by these pre-Columbian botanists.

The enthusiasm of the author may lead him to overestimate the actual progress made by the Aztecs in this science, but every one who reads his elaborate essay must feel a curious shock of surprise at finding that so much can be probably claimed for them.

L. P. GRATACAP.

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(Comprises: Chapter i., Geographical Botany; Chapter ii., Description of the Forest Trees of Northern California and Oregon.)

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